Appendix 3-6

Cost of Service Procedures

Cost-of-Service Calculation Procedures and Premises (ROI Analysis)

J-curves are constructed by plotting COS as a function of pipeline gas flow rate. The COS was determined using a ROI economic analysis based on the following information:

Compressor station location and equipment sizing based on hydraulic simulation;

Capital cost estimate for the pipeline and compressor stations including the schedule of capital outlays during construction;

Fuel consumption based on simulated equipment loads;

Estimate of the price of fuel;

Estimate of non-fuel operating expenses; and

Composition of the pipeline gas and fuel.

Hundreds of individual COS and flow data points were required to construct the J-curves contained in this report. All of this information with exception of the gas price is either contained in or can be readily generated from the output from the gas hydraulic simulation. In order to expedite J-curve preparation, algorithms for the ROI analysis were imbedded into the gas hydraulic program code to generate the COS for a given pipeline flow scenario based on a consistent set of economic premises.

General Approach

The COS values in the J-curve analysis were defined as the difference between the value of gas at the inlet of the pipeline, or purchase price, and the value of the gas at the terminus, or sales price, required to generate a 10% ROI over a 25-year project life. A 10% ROI value was chosen as the threshold for economic viability since this equates to a return-on-equity (ROE) of approximately 12.5% to 13%, which is a reasonable value for a regulated gas transmission pipeline that does not bear cost risks. The ultimate investors in the spur line project may have a different economic threshold.

Natural gas is bought and sold on a thermal, or btu, bases since the commodity of interest is the energy content of the gas not the gas volume. The COS was determined on a thermal basis and is expressed as $ per MMBTU in year 2006 dollars.

Compressor station fuel was valued at the gas purchase price at the pipeline inlet and was held constant for all pipeline and station scenarios. The sales price at the pipeline terminus was adjusted to yield a ROI of 10%. Compressor station fuel is deducted from pipeline flow at each station and is address in the ROI analysis be simply selling less BTUs than what was purchased at the pipeline inlet.

Individual points on the J-curves consist of COS plotted against the delivered at the pipeline terminus after reduction of fuel. Flow leaving the pipeline was used in order to express COS on the same thermal flow basis entering and leaving the pipeline.

Annual cash flows for the ROI calculation were determined as:

Cash flow = Net operating income before taxes
minus *project capital outlays*
minus *property tax*
minus *state taxes*
minus *federal taxes*

All values in the ROI cash flow calculations were expressed in nominal dollars per year.

Net Operating Income before Taxes

The net operating income before taxes was calculated as:

Net operating income before taxes = value of the gas delivered at the pipeline terminus

minus *purchase price of gas at the pipeline inlet*

minus *non-fuel pipeline and station operating costs*

Gas prices expressed as $/MMBTU were applied to the thermal content of the gas. The gas purchase and sales prices were expressed in year 2006 dollars and escalated at 2.5% per year to reflect nominal annual values. The non-fuel operating expense was similarly expressed in year 2006 dollars and escalated at 2.5% per year.

Project Capital Outlays

Budget level capital cost estimates were prepared for 18-, 20-, 24- and 28-inch pipelines with maximum allowable operating pressures of 1,480 and 2,500 psig. These eight pipeline costs estimates were expressed in 2006 dollars. A schedule of capital outlays, expressed as percent of total cost by year prior to start-up, was applied to the total pipeline cost to determine the annual capital outlays. The 2006 costs were escalated at 2.5% per year to reflect the nominal value according to the project year of the outlay.

Capital costs for the compressor stations were determined based on compressor size and the number of stations required to accommodate a prescribed flow rate. It was assumed that the 40% of the capital outlay for station construction would occur two years prior to start-up with the 60% balance occurring in the following year. The station capital costs, expressed in year 2005 dollars, were escalated by 2.5% to reflect the nominal annual value by project year.

Tax Depreciation and Amortization

Tax depreciation is calculated based on the cumulative capital outlay expended prior to commissioning of a project component. Data for a J-curve is generated based on the assumption that gas flow starts at a given rate and remains constant over the life of the project. Subject to this premise, the pipeline and all station equipment were modeled as being placed in service at project start-up.

All annual capital outlays for the pipeline and stations prior to start-up, expressed in nominal yearly dollars, were summed to yield the total outlay for tax depreciation beginning in the first year of project revenue generation. A 20-year year MACRS tax depreciation schedule appropriate for pipelines and attendant equipment was applied to this sum of capital outlay with first year of the MACRS schedule assigned to the startup year in which the asset was placed in service. The annual schedule of tax depreciation was deducted from the net operating income before taxes, expressed in nominal yearly values, to generate both state and federal taxable income.

Property Taxes

Property taxes prior to pipeline startup have a significant negative impact on ROI and have been the source of much debate between pipeline project sponsors and the State of Alaska. Complicating this issue is that property taxes are paid to municipalities while the

State of Alaska has been negotiating contract terms. The economics are based on a premise that property taxes would not be assessed until one year prior to project startup.

Annual property taxes were calculated as 2 percent of the annual combined book value of the pipeline and compressor stations. Property taxes in the year prior to start-up are calculated based on the sum of capital outlays, expressed in nominal dollars, prior to and including that year.

A 25-year straight-line depreciation schedule was applied to the sum of capital outlays prior to and including the first year of project operation. The cumulative annual book depreciation was calculated as the sum of all annual depreciation prior to and including the subject year. For example, a cumulative book depreciation of $1/25^{th}$ of the total capital outlay was applied in the start-up year, $2/25^{th}$ in the second year and so on. The annual basis for property tax calculation was determined as the sum of nominal capital outlays minus the cumulative book depreciation through the subject year.

State Corporate Taxes

State taxable income was determined as net operating income before taxes minus tax depreciation minus property taxes. A state corporate income tax rate of 9.4% of taxable income was applied to the state taxable income.

Federal Corporate Taxes

Taxable income for federal purposes was determined as net operating income before taxes minus tax depreciation minus property taxes minus state income taxes. Federal corporate taxes were calculated us a 35% tax rate.

Fuel and Gas Purchase Price

The turbine drivers for the pipeline gas and refrigerant compressors will burn natural gas removed from the pipeline. Fuel consumption for the gas and refrigerant compression was estimated based on the operating horsepower of the compressors and equipment specific fuel consumption rates.

Fuel composition was estimated via simulation of a simple J-T type gas utilizing the difference between fuel system and pipeline operating pressures. The composition of the gas delivered at the pipeline terminus was adjusted to account for the difference in pipeline and fuel gas compositions.

A small amount of electrical power will be required to operate motors for the fans on the refrigerant condensers and other equipment. Fuel consumption for power generation will be small compared to that of the gas and refrigerant compressors and was ignored for the purposes of the J-curve analysis.

The value of the gas at the pipeline inlet influences the COS analysis only in that it sets the value of fuel consumed at the compressor stations. A gas purchase and fuel price of $4.00/mmbtu was used for the J-curve analysis based on the following reasoning:

$2.70 to $3.70/MMbtu North Slope price at the inlet of the 52-inch pipeline per the gas case of the Gas Market Assessment – assume an average of $3.20/MMbtu;

“Raw” gas transported through 52-inch pipeline from North Slope to Fairbanks (Page 12 of Appendix to Gas Market Assessment); CO2 free heating value of raw gas is 1,169 btu/scf;

Average tariff of $0.53/Mscf from North Slope to Fairbanks (Table 3 on page 22 of Appendix to Gas Market Assessment); $0.45/MMbtu for 1,169 btu/scf gas

Approximate value of gas at the inlet to spur line excluding natural gas processing charge of $3.65/MMbtu ($3.20 + $0.45);

Assume $4.00/MMbtu as reasonable approximation of value of gas entering spur line after consideration of gas processing costs and approximation methods.

General Premises

The following premises were used in the ROI analyses:

1. 25 year project life after start-up;
2. 2.5 percent GDP deflator for escalation of monies to express values on a nominal yearly basis (i.e., no real inflation);
3. No leveraged financing or interest during construction due to ROI calculation method;
4. Capital and operating costs for the pipeline were based on year 2006 dollars and then escalated;
5. Capital and operating costs expenditures for compressor stations were based on year 2005 dollars and then escalated;
6. Gas prices were based on 2006 dollars and then escalated;
7. Non-fuel annual operating costs for the pipeline were estimated as $5 million regardless of the pipeline diameter;
8. Non-fuel operating costs for the compressor stations were estimated as 5 percent of the installed capital cost of the compressor stations;
9. Large negative cash flows were allowed during construction consistent with the ROI analysis approach; and

State and federal corporate income taxes were calculated beginning in the year of project start-up and “negative” income taxes were not calculated during construction.